

FM 4-150

WAR DEPARTMENT

COAST ARTILLERY
FIELD MANUAL



EXAMINATION FOR GUNNERS

FM 4-150

COAST ARTILLERY FIELD MANUAL



EXAMINATION FOR GUNNERS

Prepared under direction of the
Chief of Coast Artillery



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BY ORDER OF THE SECRETARY OF WAR:

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COAST ARTILLERY FIELD MANUAL

EXAMINATION FOR GUNNERS

(The matter contained herein supersedes TR 435-310, January 2, 1932, including C 1, January 2, 1934.)

CHAPTER 1

GENERAL

■ 1. OBJECT OF EXAMINATION.—The object of this examination is to determine specially qualified enlisted men in the use of the principal arm as designated in AR 35-2380, to furnish a basis for their classification as gunners, and to encourage members of Coast Artillery Reserve Officers' Training Corps units, cadets of the United States Military Academy, Coast Artillery Citizens' Military Training Camp trainees, and enlisted men of the National Guard by giving them an opportunity to qualify as gunners.

■ 2. CLASSIFICATION OF GUNNERS.—Gunnery will be divided into three classes—expert, first class, and second class—the classification depending upon the scope of the examination and the percentage obtained. The scope of the examination will be as hereinafter stated. The qualifying mark for classification as second-class gunner will be not less than an average of 75 percent, for first-class gunner not less than an average of 85 percent, and for expert gunner not less than an average of 90 percent.

■ 3. ELIGIBILITY OF CANDIDATES.—a. Every enlisted man of the Coast Artillery Corps of the Regular Army (including Philippine Scouts), and every enlisted man of the Detached Enlisted Men's List actually engaged upon duties requiring the maintenance of proficiency in the subjects enumerated herein, whose battery or detachment commander certifies that his character is at least equal to "very good," is eligible and will take the examination for qualification as a second-class gunner, provided he has received the proper course of instruction. Candidates for first-class gunner must have previously qualified as second-class gunner and, similarly, candidates for expert gunner must have qualified as first-class gunner,

though all qualifications may be made at the same examination.

b. Any member of a Coast Artillery Reserve Officers' Training Corps unit, whose unit commander certifies that in his belief he is properly qualified, is eligible for examination as a second-class gunner. The member who has successfully completed the examination for a second-class gunner, and who has had 2 years' duty with a Coast Artillery Reserve Officers' Training Corps unit, or the equivalent thereof, may take the examination for a first-class gunner; and, similarly, a member who has qualified as a first-class gunner, and who has had 3 years' duty with a Coast Artillery Reserve Officers' Training Corps unit, or the equivalent thereof, may take the examination for expert gunner.

c. Cadets of the United States Military Academy, Coast Artillery Citizens' Military Training Camp trainees, and enlisted men of the National Guard are eligible for examination for qualification as coast artillery gunners provided they are certified as qualified by their respective unit commanders. Candidates for first-class gunners must have previously qualified as second-class gunners and, similarly, candidates for expert gunners must have qualified as first-class gunners, though all qualifications may be made at the same examination.

■ 4. REQUALIFICATION.—a. (1) An enlisted man having qualified as expert or first-class gunner may elect to retain classification as such during the current enlistment without requalification, with the understanding that he may not draw, nor be on the eligible list for additional compensation for more than 1 year from date of qualifying. However, such enlisted man may, at any time, renew his right to be placed on the eligible list for additional compensation by requalifying in the rating held. In order to carry the retained rating into a new enlistment, a qualified enlisted man must reenlist within 3 months from date of discharge in an organization having as its principal arm or arms the arm or arms with which he is qualified, such reenlistment being within 1 year of date of qualification.

(2) An enlisted man holding rating as expert or first-class gunner is not required to requalify in a lower rating.

(3) An enlisted man holding rating as second-class gunner will not be required to requalify as such during his current enlistment.

b. Requalification of enlisted men of the National Guard Coast Artillery as gunners will not be required during the enlistment in which qualification is made, but will be required in each subsequent enlistment.

c. Requalification is not required for cadets of the United States Military Academy, members of a Coast Artillery Reserve Officers' Training Corps unit, or trainees of a Coast Artillery Citizens' Military Training Camp, not authorized additional compensation.

■ 5. ADDITIONAL COMPENSATION.—a. For regulations pertaining to additional compensation for enlisted men for special qualifications see AR 35-2380.

b. Additional compensation will be paid to expert and first-class gunners only in the numbers authorized from time to time by the War Department.

■ 6. BADGES.—For information as to gunners' badges see AR 600-35, 600-40, and 600-75.

■ 7. INSTRUCTION OF CANDIDATES.—Prior to the examination for gunners, and in preparation therefor, brigade, harbor defense, regimental, separate battalion, and detachment commanders will cause, insofar as practicable, all coast artillerymen of their commands to be instructed carefully in the prescribed subjects. Ordinarily the indoor season will be utilized in part for this instruction.

CHAPTER 2

BOARDS OF EXAMINATION

■ 8. BY WHOM CONVENED.—*a.* Boards of examination for enlisted men will be convened by brigade, harbor defense, regimental, or separate battalion commanders. Enlisted men of the Coast Artillery Corps, not members of the command of the convening authority and for whom provision for examination has not otherwise been made, will be examined upon application, and if found qualified will be announced as gunners by the authority convening the board conducting their examinations. In case it is not practicable for enlisted men of the Coast Artillery Corps who are on duty other than with a coast artillery command to present themselves for examination to one of the boards heretofore mentioned, and in all cases in which three coast artillery officers are not available, the corps area or department commander will convene boards of coast artillery officers to conduct the examinations and will announce the gunners as a result of these examinations. At the discretion of those commanders authorized to convene examining boards, supplementary gunners' examinations may be held for those enlisted men who for any reason were not examined during the regular examination.

b. Boards for the examination of members of Coast Artillery Reserve Officers' Training Corps units may be convened annually either at the institution or at the summer encampment, if it is desired to hold an examination for gunners. The corps area commander will determine at which place the examinations will be held. If there are three coast artillery officers available and the examination is held at the institution, the professor of military science and tactics of that institution will convene the board; or if the examination is held at the summer encampment the camp commander will convene the board. In case three coast artillery officers are not available, the corps area commander will convene the board. The convening authority will announce the result of the examinations.

c. Boards of examination for trainees of Coast Artillery Citizens' Military Training Camps will be convened by the regimental or camp commander, if it is desired to hold an examination for gunners.

d. The composition of boards to examine regular and student personnel on duty at the United States Military Academy will be as determined by the Superintendent, United States Military Academy, if it is desired to hold an examination for gunners.

■ 9. COMPOSITION.—The examining board will consist, when practicable, of three coast artillery officers. When a battery commander is a member of a board, he will be relieved by another officer during the examination of candidates from his battery. Examining boards convened by corps area or department commanders may consist of one or more coast artillery officers as in their judgment best meets the needs of the service.

■ 10. WHERE HELD.—The examination of gunner candidates will be held as far as practicable at such places as the matériel pertaining to the subject in hand is located and will be made as practical as possible.

■ 11. HOW CONDUCTED.—Boards convened by harbor defense or regimental commanders will conduct the examinations by battery, attaching extra men to batteries for the examinations. Detachments serving in a harbor defense or with a regiment will be regarded as batteries for the purpose of examination. Boards convened by corps area, department, or brigade commanders will conduct the examination in such manner as will best meet the demands of the particular case. In determining the qualification of candidates, credit will be given for practical knowledge of subjects rather than for textbook answers to questions. The character of the examination must be sufficiently searching in its details to eliminate the superficially prepared candidate and to insure the uncovering of the candidate who by work and study has acquired a knowledge and proficiency which will materially increase his usefulness to the service. Whenever, during the progress of the examination of a candidate, the sum of the

marks received on subjects for which he has already been examined, increased by the maximum allowed for the remaining subjects, is less than required for qualification, he will be disqualified and his examination will be discontinued.

■ 12. RECORDS AND REPORTS.—Information on the subject of records and reports will be found in AR 345-1000.

■ 13. SUPPLEMENTARY EXAMINATIONS.—No man qualifying during a supplementary examination can be designated as entitled to receive additional compensation unless the total prescribed by the War Department for the organization of which he is a member was not filled as a result of the regular annual examination.

CHAPTER 3

SCOPE OF EXAMINATIONS

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SECTION I

GENERAL

■ 14. ENLISTED MEN.—a. The scope of the examination of enlisted men who are candidates for gunners will be that prescribed for the particular organization to which the candidate is assigned or attached, except that candidates who are members of harbor defense, railway, or tractor-drawn organizations having antiaircraft as an additional assignment may be examined on either of the two types of matériel to which assigned. For candidates not on duty with an organization the candidate may elect to take any one set of the authorized examinations. The examination of candidates for expert gunner will be conducted with such thoroughness as to assure that for qualification the candidate has a good practical knowledge of the subject, and that he has the ability to impart that knowledge to others.

b. An examination for the grade of expert, first-class, or second-class gunner for members of maintenance detachments will be one of those appearing herein under the type armament with which the candidate is assigned or working, to be designated by his commanding officer, and will be that most applicable to his duties.

■ 15. COAST ARTILLERY RESERVE OFFICERS' TRAINING CORPS.—The examination to be taken by candidates for gunners of a Coast Artillery Reserve Officers' Training Corps unit will be one of those prescribed herein for particular organizations and will be selected by the senior coast artillery officer on duty with the unit, subject to the approval of the corps area commander. The same standard will apply in the case of members of the Coast Artillery Reserve Officers' Training Corps units as applies in the case of enlisted men, and the examination will be conducted in a similar manner.

■ 16. CITIZENS' MILITARY TRAINING CAMPS.—The examination to be taken by trainees of the Coast Artillery Citizens' Military Training Camps will be one of those prescribed herein and will be selected by the regimental or camp commander. The same standard will apply and the examinations will be conducted in a similar manner.

SECTION II

FIXED BATTERIES, HARBOR DEFENSE

- 17. SECOND-CLASS GUNNERS.—*a.* Service of the piece (practical). (This will include actual drill at the battery in which the candidate will perform in turn the duties of such members of the gun section as the board may direct) ----- 40
- b.* Nomenclature of the various parts of the gun and carriage ----- 10
- c.* Action, care, and minor adjustments of the various parts of the gun and carriage ----- 20
- d.* Powders, projectiles, primers, and fuzes, to include precautions in handling ----- 10
- e.* Cordage and mechanical maneuvers ----- 10

- f.* Nomenclature, action and maintenance of the small arm with which the organization is equipped and its ammunition ----- 10
- 100

- 18. FIRST-CLASS GUNNERS.—*a.* Duties of range section (theoretical, 10; practical, 30). (The candidate will act in turn in such positions of the range section while tracking a moving (actual or hypothetical) target as the board may direct) ----- 40
- b.* Use, orientation, and adjustment of observing instruments (practical) ----- 15
- c.* Pointing methods and instruments (theoretical, 5; practical, 5) ----- 10
- d.* Use and care of telephones ----- 10
- (1) Sending, receiving, and recording messages.
- (2) Laying wire, making connections, and tests.
- e.* Nomenclature, action, service, and drill of anti-aircraft machine gun; its mount, ammunition, and targets ----- 10
- f.* Elementary definitions for seacoast artillery ----- 5
- g.* Indication, identification, and characteristic features of warships ----- 10
- 100

NOTE.—The examination in subjects *a*, *b*, *c*, and *d* above for both second-class and first-class gunners will be confined to the matériel of that part of the defense to which the battery is assigned.

■ 19. EXPERT GUNNERS.—The candidate will be required to pass in one of the following subjects:

- a.* Duties of gun commander and gun pointer.
- (1) Definitions and elementary principles for seacoast artillery ----- 10
- (2) Gun and carriage ----- 30
- (a) Detailed knowledge of the functioning of the several parts.
- (b) Inspection and maintenance, to include dismounting, care, cleaning, painting, packing, and adjusting of the several parts.

(3) Ammunition	10
(a) Storage and care.	
(b) Preparation of powder charges.	
(c) Filling, fuzing, and preparing projectiles for firing.	
(d) Painting projectiles.	
(4) Ability to instruct in the duties of each member of the gun section (practical)	10
(5) Preparations for subcaliber and service practice, to include safety precautions before and during firing	10
(6) Pointing	20
(a) Methods of pointing and pointing tests.	
(b) Bore sighting and orientation.	
(c) Adjustment of sights or quadrants (practical).	
(7) Organization of a position	10
(a) Camouflage and camouflage discipline.	
(b) Protection against low-flying aircraft and construction of shelters.	
	100
<i>b. Duties of plotter.</i>	
(1) Definitions and elementary principles for seacoast artillery	10
(2) Position-finding system	15
(a) Detailed knowledge of the system in use in the battery.	
(b) Emergency systems.	
(3) Position-finding apparatus	25
Detailed knowledge of the adjustment and use of all position-finding apparatus in use in the plotting room.	
(4) Ability to instruct in the duties of each member of the range section (practical)	10
(5) Elementary gunnery	20
(a) Explanation of the several corrections to be applied to the observed range to obtain the corrected range.	
(b) The meteorological message and how to interpret and apply it.	
(c) Methods of observation of fire and how to apply corrections	10

(7) Preparation of records and reports, to include a knowledge of the details of the analysis of drill and target practice	10
	100
<i>c. Duties of observer.</i>	
(1) Definitions and elementary principles for seacoast artillery	10
(2) Position-finding system	10
(a) Detailed knowledge of the system in use in the battery.	
(b) Emergency systems.	
(3) Position-finding apparatus	25
Detailed knowledge of the adjustment, care, and operation of all observing instruments and range finders in use in the battery.	
(4) Detailed knowledge of spotting system in use in battery	15
(5) Observation of fire	10
(a) Principles and methods.	
(b) Adjustment of fire.	
(6) Organization of a position	10
(a) Camouflage and camouflage discipline.	
(b) Protection against sabotage, raids, and low-flying aircraft.	
(7) General duties of observers in observation posts	10
(8) Detailed knowledge of the indication and identification of targets (naval and air), to include a general knowledge of local shipping, channels leading to the harbor, and ranges to prominent fixed objects in the field of fire of the battery	10
	100

SECTION III

MINE BATTERIES, HARBOR DEFENSE

■ 20. SECOND-CLASS GUNNERS.— <i>a. Duties on the water, except electrical tests</i>	30
<i>b. Nomenclature and care of mine matériel</i>	15

c. Service of the piece (practical). (This will include actual drill at a battery in which the candidate will perform in turn the duties of such members of the gun section as the board may direct).....	15
d. Powders, projectiles, primers, and fuzes, to include precautions in handling.....	10
e. Cordage and mechanical maneuvers.....	10
f. Cable connections and joints.....	10
g. Nomenclature, action, and maintenance of the small arm with which the organization is equipped and its ammunition.....	10

100

■ 21. FIRST-CLASS GUNNERS.—a. Duties of range section (theoretical, 5; practical, 15). (The candidate will act in turn in such positions of the range section while tracking a moving (actual or hypothetical) target as the board may direct).....	20
b. Use, orientation, and adjustment of observing instruments (practical).....	10
c. Individual duties in the loading room (practical), to include precautions in handling high explosives.....	25
d. Use and care of telephones.....	10
(1) Sending, receiving, and recording messages.	
(2) Laying wire, making connections, and tests.	
e. General knowledge of the duties of an assistant in the care, operation, and maintenance of searchlights and casemate apparatus.....	20
f. Elementary definitions for seacoast artillery.....	5
g. Indication, identification, and characteristic features of warships.....	10

100

■ 22. EXPERT GUNNERS.—The candidate will be required to pass in one of the following subjects:

a. Duties of gun commander and gun pointer.—See paragraph 19 a.	
b. Duties of casemate electrician.	
(1) Definitions and elementary principles for seacoast artillery.....	10

12

(2) Casemate apparatus.....	40
(a) Detailed knowledge of the operation and functioning of the various apparatus.	
(b) Inspection and maintenance, to include adjustment, care, and cleaning of all equipment.	
(3) Troubles and remedies.....	40
(a) Practical knowledge of the testing and repair of telephones, circuits, lamps and bells, switches, ammeters, and voltmeters.	
(b) Repair of engines, generators, transformers, kilowatt sets, and storage batteries.	
(4) Firing methods.....	10
(a) Observation.	
(b) Contact.	
(c) Delayed contact.	

100

c. Duties of chief planter and coxswain.	
(1) Definitions and elementary principles for seacoast artillery.....	10
(2) Detailed knowledge of the use and handling of all apparatus used in planting mines.....	30
(3) Planting mines.....	20
(a) Duties of noncommissioned officer in distribution box boat.	
(b) Boat drill with yawl boat.	
(c) Elementary navigation.	
(4) Ability to instruct in the duties of each member of the planter detail during the planting and raising of mines.....	15
(5) Safety precautions on the water and action in case of emergencies.....	10
(6) Ability to instruct in the making of cable connections, joints, and tests.....	15

100

d. Duties of chief loader.	
(1) Definitions and elementary principles for seacoast artillery.....	10
(2) Explosives (except powders).....	15
(a) Storing, handling, and inspection.	

(b) Trolol; handling and care.	
(3) Fuzes (detonators).....	15
(a) Description, storage, and handling.	
(b) Tests.	
(c) Preparation for use in compound plugs.	
(4) Loading-room duties.....	45
(a) Detailed knowledge of the use and handling of equipment used.	
(b) Mine transformers; storage and care, testing and measuring resistance of circuits.	
(c) Assembling and testing compound plugs.	
(d) Loading mines and delivering to planter.	
(e) Preparing and loading submines.	
(f) Records.	
(5) Unloading mines.....	15
(a) Handling and unloading mines, stripping compound plugs, safety precautions.	
(b) Disposal of explosives.	

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e. Duties of observer.

(1) Definitions and elementary principles for sea-coast artillery	19
(2) Position-finding system.....	15
(a) Detailed knowledge of the system in use in the battery.	
(b) Emergency systems.	
(3) Position-finding apparatus.....	25
Detailed knowledge of adjustment and use of all observing instruments and range finders in use.	
(4) Detailed knowledge of the spotting system in use in the battery.....	15
(5) Observation of fire.....	10
(a) Principles and methods.	
(b) Adjustment of fire.	
(6) Organization of a position.....	10
(a) Camouflage and camouflage discipline.	
(b) Protection against sabotage, raids, and low-flying aircraft.	
(7) General duties of observers in observation posts.	5

(8) Detailed knowledge of the indication and identification of targets (naval and air), to include a general knowledge of local shipping, channels leading to the harbor, and ranges to prominent fixed objects in the mine field.....	15
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100

f. Duties of plotter.

(1) Definitions and elementary principles for seacoast artillery	10
(2) Position-finding system.....	15
(a) Detailed knowledge of the system in use in the battery.	
(b) Emergency systems.	
(3) Position-finding apparatus.....	25
Detailed knowledge of adjustments and use of all position-finding apparatus used in the plotting room.	
(4) Ability to instruct in the duties of each member of the range section (practical)	10
(5) Elementary gunnery.....	20
(a) Explanation of the several corrections to be applied to the observed range to obtain the corrected range.	
(b) The meteorological message and how to interpret and apply it.	
(6) Methods of observation of fire and how to apply corrections.....	10
(7) Preparation of records and reports, to include a knowledge of the details of analysis of drill and target practice	10

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SECTION IV

HEADQUARTERS BATTERIES, HARBOR DEFENSE

- 23. SECOND-CLASS GUNNERS.—The candidate will be required to pass in the subjects prescribed in paragraph 17.
- 24. FIRST-CLASS GUNNERS.—a. Duties of an assistant in the care, operation, and maintenance of searchlights and 25-kilowatt sets.....

25

b. Use, orientation, and adjustment of observing instruments (practical)	15
c. Use and care of telephones	15
(1) Sending, receiving, and recording messages.	
(2) Laying wire, making connections, and tests.	
d. Nomenclature, action, service, and drill of anti-aircraft machine gun; its mount, ammunition, and targets	10
e. Elementary definitions for seacoast artillery	5
f. Indication, identification, and characteristic features of warships	10
g. General knowledge of the installation and operation of the harbor-defense telephone system and net, to include the duties of switchboard operators	20
	100

NOTE.—Radio communication of a scope similar to that indicated for telephone communication may be substituted for *g* above in appropriate cases.

25. EXPERT GUNNERS.—The candidate will be required to pass in one of the following subjects:

a. Duties of observer.	
(1) Definitions and elementary principles for seacoast artillery	10
(2) Position-finding system	10
Detailed knowledge of the system in use by the combat units.	
(3) Position-finding apparatus	20
Detailed knowledge of the adjustment, care, and operation of the observing instruments and range finders in use by the combat units.	
(4) Detailed knowledge of the spotting systems in use by the combat units	15
(5) Observation of fire	10
(a) Principles and methods.	
(b) Adjustment of fire.	
(6) Map reading	10
(a) Scales, contours, and conventional signs.	
(b) Location of a position by coordinates.	
(7) Organization of a position	10

(a) Camouflage and camouflage discipline.	
(b) Protection against sabotage, raids, and low-flying aircraft.	
(8) General duties of observers in observation posts ..	5
(9) Detailed knowledge of the indication and identification of targets (naval and air), to include a general knowledge of local shipping, channels leading to the harbor, and ranges to prominent fixed objects in the field of fire of the batteries	10
	100
b. Duties of plotter.	
(1) Definitions and elementary principles for seacoast artillery	10
(2) Position-finding system	20
(a) Detailed knowledge of the system in use by the combat units.	
(b) Duties of each member of a combat unit range section.	
(3) Position-finding apparatus	25
Detailed knowledge of the adjustment, care, and use of all position-finding apparatus used in the plotting rooms of combat units.	
(4) Elementary gunnery	20
(a) Explanation of the several corrections to be applied to the observed range to obtain the corrected range.	
(b) The meteorological message and how to interpret and apply it.	
(5) Methods of observation of fire and how to apply corrections	10
(6) Use of firing tables, charts, and scales	15
	100

SECTION V

TRACTOR-DRAWN BATTERIES

■ 26. SECOND-CLASS GUNNERS.—a. Service of the piece (practical). (This will include actual drill, emplacement, and march order maneuvers in which the candidate will perform in turn the duties of such members of the gun section as the board may direct)	35
---	----

b. Nomenclature of the various parts of the gun, carriage and emplacement matériel.....	10
c. Action, care, and minor adjustments of the various parts of the gun and carriage.....	10
d. Powders, projectiles, primers, and fuzes, to include precautions in handling.....	10
e. Cordage and mechanical maneuvers.....	10
f. Nomenclature, action, and maintenance of the small arm with which the organization is equipped and its ammunition.....	10
g. Motor transportation.....	15
(1) Nomenclature of major parts.	
(2) Practical operation of motor vehicles, to include driving and fueling.	

100

NOTE.—For cadets of the United State Military Academy, members of Reserve Officers' Training Corps units, and trainees of Citizens' Military Training Camps the following may be substituted for *g* above: Drill for foot troops, the squad (FM 22-5).

■ 27. FIRST-CLASS GUNNERS.— <i>a</i> . Duties of range section (theoretical, 5; practical, 15). (The candidate will act in turn in such positions of the range section while tracking a moving (actual or hypothetical) target as the board may direct).....	20
<i>b</i> . Use, orientation, and adjustment of observing instruments (practical).....	10
<i>c</i> . Pointing methods and instruments (theoretical, 5; practical, 5).....	10
<i>d</i> . Use and care of telephones.....	15
(1) Sending, receiving, and recording messages.	
(2) Laying wire, making connections, and tests.	
<i>e</i> . Nomenclature, action, service, and drill of anti-aircraft machine gun; its mount, ammunition, and targets.....	10
<i>f</i> . Elementary definitions for seacoast artillery.....	5
<i>g</i> . Indication, identification, and characteristic features of warships.....	10
<i>h</i> . Motor transportation.....	20

- (1) Duties of the driver in the care, service, repair, and maintenance of motor vehicles.
- (2) Trouble shooting and emergency repairs.
- (3) Convoy and march rules and discipline.
- (4) Handling of trucks and tractors under adverse conditions.

100

NOTE.—For cadets at the United States Military Academy, members of Reserve Officers' Training Corps units, and trainees of Citizens' Military Training Camps the following may be substituted for *h* above: Drill for foot troops, the platoon (FM 22-5).

■ 28. EXPERT GUNNERS.—The candidate will be required to pass in one of the following subjects:

<i>a</i> . Duties of gun commander, chief of gun squads, and gun pointer.	
(1) Definitions and elementary principles for seacoast artillery.....	5
(2) Gun and carriage.....	25
(<i>a</i>) Detailed knowledge of the functioning of the several parts.	
(<i>b</i>) Inspection and maintenance, to include dismounting, care, cleaning, painting, packing, and adjusting the several parts.	
(3) Ability to instruct in the duties of each member of the gun section (practical).....	15
(<i>a</i>) Drill at the gun.	
(<i>b</i>) Occupation of and withdrawal from position.	
(<i>c</i>) Maneuvering, to include various methods of maneuvering gun in and out of position and on the march, and the use of maneuvering matériel, cordage, tackles, jacks, man power, and tractor.	
(4) Organization of a position.....	10
(<i>a</i>) Camouflage and camouflage discipline.	
(<i>b</i>) Protection against low-flying aircraft and construction of shelters.	
(<i>c</i>) Protection against mechanized forces.	
(5) Ammunition.....	10
(<i>a</i>) Storage and care.	
(<i>b</i>) Preparation of powder charges.	

(c) Filling, fuzing, and preparing projectiles for firing.	
(d) Painting projectiles.	
(6) Preparations for subcaliber and service practice, to include safety precautions before and during firing.	10
(7) Pointing	10
(a) Methods of pointing and pointing tests.	
(b) Bore sighting and orientation.	
(c) Adjustment of sights and aiming rule (practical).	
(8) Map reading	10
(a) Scales, contours, and conventional signs.	
(b) Location of a position by coordinates.	
(c) Ability to follow routes indicated on the map.	
(9) March rules and discipline	5
	100

b. Duties of plotter.

(1) Definitions and elementary principles for sea-coast artillery	5
(2) Position-finding system	15
(a) Detailed knowledge of the system in use in the battery.	
(b) Emergency systems.	
(3) Position-finding apparatus	20
Detailed knowledge of adjustment, care, and use of all position-finding apparatus used in the plotting room.	
(4) Ability to instruct in the duties of each member of the range section (practical)	10
(5) Elementary gunnery	20
(a) Explanation of the several corrections to be applied to the observed range to obtain the corrected range.	
(b) The meteorological message and how to interpret and apply it.	
(6) Map reading	10
(a) Scales, contours, and conventional signs.	
(b) Location of a position by coordinates.	
(7) Methods of observation of fire and how to apply corrections	10

(8) Preparation of records and reports, to include a knowledge of the details of analysis of drill and target practice	10
	100

c. Duties of instrument sergeant.

(1) Definitions and elementary principles for seacoast artillery	5
(2) Position-finding system	10
(a) Detailed knowledge of the system in use in the battery.	
(b) Emergency systems.	
(3) Position-finding apparatus	20
Detailed knowledge of adjustment, care, and operation of all observing instruments and range finders in use in the battery.	
(4) Detailed knowledge of spotting system in use in the battery	10
(5) Observation of fire	10
(a) Principles and methods.	
(b) Adjustment of fire.	
(6) Map reading	10
(a) Scales, contours, and conventional signs.	
(b) Location of a position by coordinates.	
(7) Duties of an assistant in the use of transit in establishing a battery position	10
(8) Organization of a position	10
(a) Camouflage and camouflage discipline.	
(b) Protection against sabotage, raids, and low-flying aircraft.	
(9) General duties of observers in observation posts	5
(10) Detailed knowledge of the indication and identification of targets (naval and air), to include a general knowledge of local shipping, channels leading to the harbor, and ranges to prominent fixed objects in the field of fire of the battery	10
	100

<i>d. Duties of communication sergeant.</i>	
(1) Systems of communication.....	20
A thorough knowledge of all types of field telephones, switchboards, and power and telephone lines.	
(2) Elementary principles of electricity, magnetism, and induction.....	10
(3) Visual signaling—panels.....	5
(4) Installation of a complete field telephone system required by the unit, including the utilization of natural features of the terrain, and artificial means for protection and concealment of cables, wires, and switchboard centrals.....	15
(5) Time interval system.....	15
Detailed knowledge of the operation and installation.	
(6) Location of faults, tests for grounds, and short circuits.....	10
(7) Installation and operation of message centers; coding and decoding.....	15
(8) Ability to instruct in the duties of linemen and telephone and switchboard operators under all conditions.....	10
	100
<i>e. Duties of transportation sergeant.</i>	
(1) Principles of internal-combustion engines, including detailed knowledge of the care, service, repair, and operation; functioning of component units, systems, and parts; and the making of minor repairs.....	20
(2) Inspection and maintenance of transmission gears, differentials, cooling systems, and storage batteries; inspection, maintenance, and adjustment of clutches, brakes, spark plugs, electrical systems, carburetors, valves, governors, and steering mechanisms....	20
(3) Elementary principles of electricity, magnetism, and induction.....	10
(4) Shop practices, supervision, and instruction of mechanics.....	15

Detailed knowledge of the care and use of the mechanic's tools issued to the organization.	
(5) Loads and their proper distribution.....	5
(6) Training of drivers.....	10
(7) Detailed knowledge of the rules of the road, convoy regulations and discipline, speed laws and regulations, parking, and road inspections.....	10
(8) Records and reports.....	10
	100

SECTION VI

RAILWAY BATTERIES

■ 29. SECOND-CLASS GUNNERS.— <i>a. Service of the piece (practical). (This will include actual drill and emplacement in which the candidate will perform in turn the duties of such members of the gun section as the board may direct)</i> -----	35
<i>b. Nomenclature of the various parts of the gun, carriage, and emplacement matériel</i> -----	10
<i>c. Action, care, and minor adjustment of the various parts of the gun and carriage</i> -----	10
<i>d. Powders, projectiles, primers, and fuzes, to include precautions in handling</i> -----	10
<i>e. Cordage and mechanical maneuvers</i> -----	10
<i>f. Nomenclature, action, and maintenance of the small arm with which the organization is equipped and its ammunition</i> -----	10
<i>g. Nomenclature of railroad track matériel; practical knowledge of packing journal boxes, brake mechanisms, buffers, and couplings</i> -----	15
	100
■ 30. FIRST-CLASS GUNNERS.— <i>a. Duties of range section (theoretical, 10; practical, 30). (The candidate will act in turn in such positions of the range section while tracking a moving (actual or hypothetical) target as the board may direct)</i> -----	40

b. Use, orientation, and adjustment of observing instruments (practical)	10
c. Pointing methods and instruments (theoretical, 5; practical, 5)	10
d. Use and care of telephones	15
(1) Sending, receiving, and recording messages.	
(2) Laying wire, making connections, and tests.	
e. Nomenclature, action, service, and drill of anti-aircraft machine gun; its mount, ammunition, and targets	10
f. Elementary definitions for seacoast artillery	5
g. Indication, identification, and characteristic features of warships	10
	100
■ 31. EXPERT GUNNERS.—The candidate will be required to pass in one of the following subjects:	
a. <i>Duties of plotters.</i> —See paragraph 28 b.	
b. <i>Duties of instrument sergeant.</i> —See paragraph 28 c.	
c. <i>Duties of communication sergeant.</i> —See paragraph 28 d.	
d. <i>Duties of gun commander, chief of section, and gun pointer.</i>	
(1) Definitions and elementary principles for seacoast artillery	5
(2) Gun and carriage	20
(a) Detailed knowledge of the functioning of the several parts.	
(b) Inspection and maintenance, to include dismounting, care, cleaning, painting, packing, and adjusting the several parts.	
(3) Railway cars	10
(a) Nomenclature, care, and operation of trucks, hand brakes, air brakes, couplers, and draft gear.	
(b) Preparation of matériel for movement.	
(c) Use of narrow or standard gage equipment.	
(4) Ability to instruct in the duties of each member of the gun section (practical)	15
(a) Drill at the gun.	
(b) Placing the gun in position.	

(5) Organization of a position	10
(a) Camouflage and camouflage discipline.	
(b) Protection against low-flying aircraft and construction of shelters.	
(6) Ammunition	10
(a) Storage and care.	
(b) Preparation of powder charges.	
(c) Filling, fuzing, and preparing projectiles for firing.	
(d) Painting projectiles.	
(7) Preparations for subcaliber and service practice, to include safety precautions before and during firing	10
(8) Pointing	10
(a) Methods of pointing and pointing tests.	
(b) Bore sighting and orientation.	
(c) Adjustment of sights and aiming rule (practical).	
(9) Map reading	10
(a) Scales, contours, and conventional signs.	
(b) Location of a position by coordinates.	
	100
e. <i>Duties of railway sergeant.</i>	
(1) Railway cars	35
(a) Detailed knowledge of the functioning of the several parts.	
(b) Inspection of matériel, to include journal boxes, couplings, air brakes, centrifugal dirt collectors, hand brakes, brake shoes, and wheels.	
(c) Maintenance of matériel, including adjustment of matériel, minor repairs, replacements, and packing journal boxes.	
(2) Railway movements	25
(a) Practical understanding of manuals, orders, and regulations on car operation.	
(b) Duties of train conductor, to include arrangements for guards in personnel cars and on all open cars loaded with matériel; information relative to weights, contents, clearances, classes, and numbers of cars in train.	

(c) Safety precautions for personnel during movements.	
(3) Track construction	20
Practical knowledge of track and spur construction.	
(4) Practical knowledge on the subject of loading and unloading cars	10
(5) Make-up of trains for approaching combat battery positions; precautions to avoid unnecessary travel and switching in placing various cars in position	10
	100

SECTION VII

HEADQUARTERS BATTERIES, MOBILE SEA-COAST ARTILLERY UNITS

■ 32. SECOND-CLASS GUNNERS.—Candidates in these batteries will be required to pass in the subjects prescribed for a firing battery of the same organization.	
■ 33. FIRST-CLASS GUNNERS.— <i>a.</i> Use, orientation, and adjustment of observing instruments (practical)	15
<i>b.</i> Orientation and reconnaissance	20
(1) Duties of rodman and chainman.	
(2) Duties of agent and scout.	
<i>c.</i> Use and care of telephones	15
(1) Sending, receiving, and recording messages.	
(2) Laying wire, making connections, and tests.	
<i>d.</i> Elementary definitions for seacoast artillery	5
<i>e.</i> Indication, identification, and characteristic features of warships	10
<i>f.</i> Motor transportation	20
(1) Duties of the driver in the care, service, repair, and maintenance of motor vehicles.	
(2) Trouble shooting and emergency repairs.	
(3) Convoy and march rules and discipline.	
(4) Handling of trucks and tractors under adverse conditions.	
<i>g.</i> General knowledge of the installation and operation of the brigade, regimental, or battalion telephone	

system and net, to include the duties of switchboard operators	15
	100

NOTE.—Radio communication, of a scope similar to that indicated for telephone communication, may be substituted for *g* above in appropriate cases.

■ 34. EXPERT GUNNERS.—The candidate will be required to pass in one of the following subjects:

a. Duties of plotter.—See paragraph 25 *b.* (For candidates of tractor-drawn and railway battalions only.)

b. Duties of transportation sergeant.—See paragraph 28 *e.*

c. Duties of communication sergeant.—See paragraph 28 *d.*

d. Duties of railway sergeant.—See paragraph 31 *e.* (For candidates of railway artillery units only.)

e. Duties of instrument sergeant.

(1) Definitions and elementary principles for seacoast artillery	5
(2) Position-finding system	10
(<i>a.</i>) Detailed knowledge of the system in use by the combat units.	
(<i>b.</i>) Emergency systems.	
(3) Position-finding apparatus	20
Detailed knowledge of the adjustment, care, and operation of the observing instruments and range finders in use by the combat units.	
(4) Detailed knowledge of the spotting system in use by the combat units	10
(5) Observation of fire	10
(<i>a.</i>) Principles and methods.	
(<i>b.</i>) Adjustment of fire.	
(6) Map reading	10
(<i>a.</i>) Scales, contours, and conventional signs.	
(<i>b.</i>) Location of a position by coordinates.	
(7) Duties of an assistant in the use of a transit in establishing a battery position	10
(8) Organization of a position	10
(<i>a.</i>) Camouflage and camouflage discipline.	

(b) Protection against sabotage, raids, and low-flying aircraft.	
(9) General duties of observers in observation posts.	5
(10) Detailed knowledge of the indication and identification of targets (naval and air), to include a general knowledge of local shipping, channels leading to the harbor, and ranges to permanent fixed objects in the field of fire of the batteries.	10
	100

SECTION VIII

SERVICE BATTERIES

■ 35. SECOND-CLASS GUNNERS.—a. Service of the piece (practical). (The candidate will be attached by the regimental commander to one of the gun batteries for this part of the examination)	15
b. Nomenclature of the matériel in which examined under a above	10
c. Action, care, and minor adjustments of the matériel on which examined under a above	10
d. Ammunition for the matériel in which examined under a above	10
e. Cordage and mechanical maneuvers	10
f. Nomenclature, action, and maintenance of the small arms with which the organization is equipped and its ammunition	10
g. Supplies: Mechanics and methods of obtaining, transporting, distributing, and issuing rations, clothing, equipment, gasoline, lubricants, and other supplies; safety precautions; handling and storing; capacities of vehicles.	15
h. Motor transportation	20
(1) Nomenclature of major parts.	
(2) Practical operation of motor vehicles, to include driving and fueling.	
(3) Emergency repairs.	
	100
■ 36. FIRST-CLASS GUNNERS.—a. Motor transportation	35
(1) Duties of the driver in the care, service, repair, and maintenance of motor vehicles.	

(2) Trouble shooting and minor repairs.	
(3) Convoy and march rules and discipline.	
(4) Handling of trucks under adverse conditions.	
b. Indication, identification, and characteristic features of appropriate targets for the combat units.	15
c. Use and care of telephones.	15
(1) Sending, receiving, and recording messages.	
(2) Laying wire, making connections, and tests.	
d. Map reading	15
(1) Scales, contours, and conventional signs.	
(2) Ability to follow routes on a map.	
(3) Ability to determine data as to roads, bridges, fords, grades, swamps, etc.	
e. March rules and discipline	5
f. Definitions for coast artillery, and particular definitions pertaining to supplies and supply functions; railroad, refilling point; distributing point; classes of supplies; requisitions; shipping tickets and memorandum receipts	15
	100

■ 37. EXPERT GUNNERS; DUTIES OF TRANSPORTATION SERGEANT AND TRUCKMASTER.—The candidate will be required to pass in the subject "Duties of transportation sergeant" prescribed in paragraph 28 e.

SECTION IX

GUN BATTERIES, ANTIAIRCRAFT

■ 38. SECOND-CLASS GUNNERS.—a. Service of the piece (practical). (This will include the drill and emplacement of the gun. The candidate will perform in turn the duties of such members of the gun section as the board may direct)	30
b. Gun and mount	25
(1) Nomenclature of the various parts.	
(2) Action, care, and minor adjustments of the various parts.	
c. Ammunition, fuzes, and projectiles, to include precautions in handling	10
d. Cordage and mechanical maneuvers	10

e. Nomenclature, action, and maintenance of the small arm with which the organization is equipped and its ammunition.....	10
f. Motor transportation.....	15
(1) Nomenclature of major parts.	
(2) Practical operation of motor vehicles, to include driving and fueling.	
	100

NOTE.—For organizations having no transportation, motor transportation may be omitted and the value of subject b above increased accordingly.

■ 39. FIRST-CLASS GUNNERS.—a. Duties of range section (theoretical, 5; practical, 15). (The candidate will act in turn in such positions of the range section as the board may direct).....	20
b. Position-finding apparatus.....	15
Use, orientation, and minor adjustments of fire-control instruments (practical).	
c. Use and care of telephones.....	15
(1) Sending, receiving, and recording messages.	
(2) Laying wire, making connections, and tests.	
d. Pointing and pointing tests (practical).....	5
e. Elementary definitions for antiaircraft artillery.....	10
f. Indication, identification, and characteristic features of the several classes of aircraft.....	15
g. Motor transportation.....	20
(1) Duties of the driver in the care, service, repair, and maintenance of motor vehicles.	
(2) Trouble shooting and emergency repairs.	
(3) Convoy and march rules and discipline.	
(4) Handling of trucks and tractors under adverse conditions.	
	100

NOTE.—For organizations having no transportation, motor transportation may be omitted and the value of subject b above increased accordingly.

■ 40. EXPERT GUNNERS.—The candidate will be required to pass in one of the following subjects:

a. Duties of transportation sergeant.—See paragraph 28e.

b. Duties of gun commander and chief of section.	
(1) Definitions and elementary principles for antiaircraft artillery.....	10
(2) Gun and mount.....	25
(a) Detailed knowledge of the functioning of the several parts.	
(b) Inspection and maintenance, to include dismounting, care, cleaning, painting, packing, and adjusting the several parts.	
(c) Care and adjustment of fuze setters.	
(d) Operation and care of data transmission system in use.	
(3) Ability to instruct in the duties of each member of the gun section (practical).....	10
(a) Drill at the gun.	
(b) Emplacement.	
(4) Organization of a position.....	10
(a) Camouflage and camouflage discipline.	
(b) Protection against low-flying aircraft and construction of shelters.	
(c) Protection against mechanized forces.	
(5) Ammunition.....	5
(a) Storage and care.	
(b) Preparing projectiles for firing.	
(6) Preparations for service practice, to include safety precautions before and during firing.....	10
(7) Pointing and firing.....	15
(a) Methods of pointing.	
(b) Method of firing trial shots.	
(c) Procedure in verification and calibration firings.	
(d) Bore sighting and orientation.	
(e) Adjustment of sights.	
(8) Map reading.....	10
(a) Scales, contours, and conventional signs.	
(b) Location of a position by coordinates.	
(c) Ability to follow routes indicated on the map.	
(9) March rules and discipline.....	5

<i>c. Duties of chief of range section.</i>	
(1) Definition and elementary principles for anti-aircraft artillery.....	10
(2) Position-finding system.....	10
(a) Detailed knowledge of the system in use in the battery.	
(b) Emergency systems.	
(3) Position-finding apparatus.....	25
(a) Detailed knowledge of the adjustment, care, and operation of all fire-control and position-finding apparatus in use in the battery.	
(b) Detailed knowledge of the precautions to be taken in the loading, unloading, and transportation of fire-control and position-finding apparatus in use in the battery.	
(4) Ability to instruct in the duties of each member of the range section (practical).....	10
(5) Elementary gunnery.....	25
(a) Explanation of the several corrections necessary to obtain the final firing data.	
(b) Effect on the flight of the projectile due to non-standard conditions.	
(c) The meteorological message and how to interpret and apply it.	
(d) Purpose of trial, verification, and calibration firings.	
(e) Computation of corrections based on trial shot firings.	
(6) Methods of observation and how to apply corrections.....	10
(7) Preparation of records and reports, to include knowledge of the details of analysis of target practice...	10
	100
<i>d. Duties of instrument sergeant.</i>	
(1) Definitions and elementary principles for anti-aircraft artillery.....	10
(2) Position-finding system.....	10
(a) Detailed knowledge of the system in use in the battery.	

(b) Emergency systems.	
(3) Position-finding apparatus.....	20
(a) Detailed knowledge of the adjustment, care, and operation of all observing instruments and range finders in use in the battery.	
(b) Detailed knowledge of the precautions to be taken in the loading, unloading, and transportation of fire-control and position-finding apparatus in use in the battery.	
(4) Method of observation and how to apply corrections.....	20
(5) Map reading.....	10
(a) Scales, contours, and conventional signs.	
(b) Location of a position by coordinates.	
(6) Duties of an assistant in the use of a transit in establishing a battery position.....	10
(7) Organization of a position.....	10
(a) Camouflage and camouflage discipline.	
(b) Protection against sabotage, raids, and low-flying aircraft.	
(8) Detailed knowledge of the indication and identification of targets, to include the sending of flash messages.....	10
	100
<i>e. Duties of communication sergeant.</i>	
(1) Systems of communication.....	20
A thorough knowledge of all kinds of field telephones, switchboards, and power and telephone lines.	
(2) Elementary principles of electricity, magnetism, and induction.....	10
(3) Visual signaling—panels.....	5
(4) Installation of battery field telephone system, including utilization of natural features of the terrain and artificial means for protection and concealment of cables, wires, and switchboard centrals.....	15
(5) Data transmission systems.....	15
(a) Detailed knowledge of the care, operation, and installation.	

(b) Precautions to be taken in the loading, unloading, and transportation of all equipment pertaining to data transmission systems.	
(6) Location of faults, tests for grounds, and short circuits	10
(7) Installation and operation of message centers, coding and decoding	15
(8) Ability to instruct in the duties of linemen and telephone and switchboard operators under all conditions	10
	100

SECTION X

MACHINE-GUN AND 37-MM GUN BATTERIES,
ANTIAIRCRAFT

■ 41. SECOND-CLASS GUNNERS.— <i>a.</i> Service of the piece (practical). (This will include the drill and emplacement of the gun. The candidate will perform in turn the duties of such members of the machine-gun squad or 37-mm gun section as the board may direct)	25
<i>b.</i> Gun and mount	35
(1) Nomenclature of the various parts of the gun and mount.	
(2) Action and care of the gun and mount, to include stripping, assembling, cleaning, and action in case of stoppages.	
(3) Safety precautions.	
<i>c.</i> Ammunition, characteristics, and service	5
<i>d.</i> Cordage and mechanical maneuvers	10
<i>e.</i> Nomenclature, action, and maintenance of the small arm with which the organization is equipped and its ammunition	10
<i>f.</i> Motor transportation	15
(1) Nomenclature of major parts.	
(2) Practical operation of motor vehicles, to include driving and fueling.	
	100

NOTE.—For organizations having no transportation, motor transportation may be omitted and the value of subject *b* above increased accordingly.

■ 42. FIRST-CLASS GUNNERS.— <i>a.</i> Use, orientation, and adjustment of fire-control instruments (practical)	10
<i>b.</i> Determination of firing data	10
Estimation of ranges, speeds, and leads.	
<i>c.</i> Use and care of telephones	15
(1) Sending, receiving, and recording messages.	
(2) Laying wire, making connections, and tests.	
<i>d.</i> Elementary definitions for antiaircraft artillery	10
<i>e.</i> Conduct and control of fire	20
(1) Methods of observing fire.	
(2) Methods of adjusting fire.	
(3) Characteristics and use of tracers.	
<i>f.</i> Indication, identification, and characteristic features of the several classes of aircraft	15
<i>g.</i> Motor transportation	20
(1) Duties of the driver in the care, service, repair, and maintenance of motor vehicles.	
(2) Trouble shooting and emergency repairs.	
(3) Convoy and march rules and discipline.	
(4) Handling of trucks under adverse conditions.	
	100

NOTE.—For organizations having no transportation, motor transportation may be omitted and the value of subjects *b* and *e* above each increased 10 points.

■ 43. EXPERT GUNNERS.—The candidate will be required to pass in one of the following subjects:	
<i>a.</i> Duties of transportation sergeant.—See paragraph 28 <i>e.</i>	
<i>b.</i> Duties of communication sergeant.—See paragraph 49 <i>c.</i>	
<i>c.</i> Duties of chief of section or platoon sergeant.	
(1) Definitions and elementary principles for antiaircraft artillery	10
(2) Gun and mount	35
(a) Detailed knowledge of the functioning of the several parts.	
(b) Ability to instruct in all phases of maintenance; packing, head space adjustment, and replacement of parts.	

- (c) Detailed knowledge of precautions to be taken in loading, unloading and transporting guns and all equipment pertaining to them.
- (3) Ability to instruct in the duties of each member of the machine-gun squad or 37-mm gun section (practical) ----- 10
- (4) Selection of position and emplacement ----- 10
- (5) Organization of a position ----- 10
- (a) Camouflage and camouflage discipline.
- (b) Protection against low-flying aircraft and construction of shelters.
- (c) Protection against mechanized forces.
- (6) Preparations for service practice, to include safety precautions before and during firing ----- 10
- (7) Map reading ----- 10
- (a) Scales, contours, and conventional signs.
- (b) Location of position by coordinates.
- (c) Ability to follow routes indicated on the map.
- (8) March rules and discipline ----- 5

100

SECTION XI

SEARCHLIGHT BATTERIES, ANTIAIRCRAFT

- 44. SECOND-CLASS GUNNERS.—a. Drill of the searchlight section (practical). (This will include actual drill on the matériel in which the candidate will perform in turn the duties of such members of the searchlight and sound-locator squads as the board may direct) ----- 45
- b. Nomenclature of various parts of the searchlight ----- 10
- c. Nomenclature of various parts of the sound-locator apparatus ----- 10
- d. Cordage and mechanical maneuvers ----- 10
- e. Nomenclature, action, and maintenance of the small arm with which the organization is equipped and its ammunition ----- 10
- f. Motor transportation ----- 15
- (1) Nomenclature of major parts.

- (2) Practical operation of motor vehicles, to include driving and fueling.

100

- 45. FIRST-CLASS GUNNERS.—a. Care and operation of power plant ----- 10
- b. Care and operation of searchlight ----- 15
- c. Care and operation of sound-locator apparatus ----- 15
- d. Use and care of telephones ----- 15
- (1) Sending, receiving, and recording messages.
- (2) Laying wire, making connections, and tests.
- e. Motor transportation ----- 20
- (1) Duties of the driver in the care, service, repair, and maintenance of motor vehicles.
- (2) Trouble shooting and emergency repairs.
- (3) Convoy and march rules and discipline.
- (4) Handling of trucks under adverse conditions.
- f. Elementary definitions for antiaircraft artillery ----- 10
- g. Indication, identification, and characteristic features of the several classes of aircraft ----- 15

100

- 46. EXPERT GUNNERS.—The candidate will be required to pass in one of the following subjects:

a. *Duties of transportation sergeant.*—See paragraph 28e.

b. *Duties of communication sergeant.*—See paragraph 49c.

c. *Duties of chief of section.*

- (1) Definitions and elementary principles for antiaircraft artillery ----- 10
- (2) Searchlight apparatus ----- 25

(a) Detailed knowledge of the functioning of the several parts.

(b) Inspection and maintenance, to include adjustments, care, and cleaning of the several parts.

(c) Ability to instruct in the duties of each member of the searchlight squad (practical).

(d) Detailed knowledge of precautions to be taken in the loading, unloading, and transportation of all searchlight equipment.	
(3) Sound-locator apparatus.....	25
(a) Detailed knowledge of the functioning of the several parts.	
(b) Inspection and maintenance, to include adjustment, care, and cleaning of the several parts.	
(c) Ability to instruct in the duties of each member of the sound-locator squad (practical).	
(d) Detailed knowledge of precautions to be taken in the loading, unloading, and transportation of all sound-locator equipment.	
(4) Troubles and remedies.....	15
Practical knowledge of testing and repair of circuits, lamps, switches, ammeters, and voltmeters.	
(5) Tactical employment of the searchlight section...	10
(a) Selection and preparation of light emplacements.	
(b) Camouflage and camouflage discipline.	
(c) Protection against mechanized forces.	
(6) Map reading.....	10
(a) Scales, contours, and conventional signs.	
(b) Location of position by coordinates.	
(c) Ability to follow routes on the map.	
(7) March rules and discipline.....	5
	100

SECTION XII

HEADQUARTERS BATTERIES, ANTIAIRCRAFT
BRIGADE OR REGIMENT

■ 47. SECOND-CLASS GUNNERS.—The candidate will be required to pass in the subjects prescribed in paragraph 38.	
■ 48. FIRST-CLASS GUNNERS.— <i>a.</i> Use, orientation, and adjustment of observing instruments (practical).....	10
<i>b.</i> Orientation and reconnaissance.....	20
(1) Duties of rodman and chainman.	
(2) Duties of agent and scout.	
<i>c.</i> Use and care of telephones.....	15
(1) Sending, receiving, and recording messages.	

(2) Laying wire, making connections, and tests.	
<i>d.</i> General knowledge of the installation and operation of the regimental or battalion telephone system and net, to include the duties of switchboard operators.....	15
<i>e.</i> Elementary definitions for antiaircraft artillery.....	10
<i>f.</i> Indication, identification, and characteristic features of the several classes of aircraft.....	15
<i>g.</i> Motor transportation.....	15
(1) Duties of the driver in the care, service, repair, and maintenance of motor vehicles.	
(2) Trouble shooting and emergency repairs.	
	100

NOTE.—Radio communication, of a scope similar to that for telephone communication, may be substituted for *d* above in appropriate cases.

■ 49. EXPERT GUNNERS.—The candidate will be required to pass in one of the following subjects:

<i>a.</i> Duties of transportation sergeant.—See paragraph 28 <i>e.</i>	
<i>b.</i> Duties of observer.	
(1) Definitions and elementary principles for antiaircraft artillery.....	10
(2) Position-finding system.....	10
Detailed knowledge of the system in use by the combat units.	
(3) Position-finding apparatus.....	15
Detailed knowledge of the adjustment, care, and operation of the observing instruments and a general knowledge of height finders and data computers in use by the combat units.	
(4) Detailed knowledge of the spotting system in use by the combat units.....	10
(5) Observation of fire.....	10
<i>a.</i> Principles and methods.	
<i>b.</i> Adjustment of fire.	
(6) Map reading.....	10
<i>a.</i> Scales, contours, and conventional signs.	
<i>b.</i> Location of a position by coordinates.	
(7) Duties of an assistant in the use of a transit in establishing a battery position.....	10

(8) Organization of a position.....	10
(a) Camouflage and camouflage discipline.	
(b) Protection against sabotage, raids, and low-flying aircraft.	
(9) General duties of observers in observation posts..	5
(10) Detailed knowledge of the indication and identification of targets, to include the sending of flash messages.....	10
	100

NOTE.—Either of the following subjects may be substituted for (7) above:

(11) Operation of the AA Spotting Set (spotting camera)...	10
(12) Operation of the meteorological section.....	10

c. Duties of communication sergeant.

(1) Systems of communication, including thorough knowledge of all types of field telephones, switchboards, and power and telephone lines.....	20
(2) Elementary principles of electricity, magnetism, and induction.....	10
(3) Visual signaling—panels.....	5
(4) Installation of a complete field telephone system required by the unit, including the utilization of natural features of the terrain and artificial means for protection and concealment for cables, wires, and switchboard centrals.....	15
(5) Practical knowledge of the available means and methods for the dissemination of antiaircraft artillery intelligence alarms, alerts, flash messages, records, and reports.....	15
(6) Location of faults, tests for grounds, and short circuits.....	10
(7) Installation and operation of message centers, coding and decoding.....	15
(8) Ability to instruct in the duties of linemen and telephone and switchboard operators under all conditions.....	10
	100

SECTION XIII

HEADQUARTERS BATTERY AND COMBAT TRAIN
ANTIAIRCRAFT BATTALION

■ 50. SECOND-CLASS GUNNERS.—The candidate will be required to pass in the subjects prescribed in either paragraph 38 or paragraph 41.

■ 51. FIRST-CLASS GUNNERS.—*a. For all candidates except those in combat train.*—The candidate will be required to pass in the subjects prescribed in paragraph 48.

b. For candidates in combat train.

(1) Motor transportation	35
(a) Duties of the driver in the care, service, repair, and maintenance of motor vehicles.	
(b) Trouble shooting and minor repairs.	
(c) Convoy and march rules and discipline.	
(d) Handling of trucks under adverse conditions.	
(2) Indication, identification, and characteristic features of appropriate targets for the combat units.....	15
(3) Transporting, handling, and storing ammunition.....	15
(4) Map reading	15
(a) Scales, contours, and conventional signs.	
(b) Ability to follow routes on a map.	
(c) Ability to determine data as to roads, bridges, fords, grades, swamps, etc.	
(5) Operation of a vehicle not in convoy.....	5
(6) Definitions for coast artillery, and particular definitions pertaining to ammunition supply; railhead; dump; refilling point; distributing point; day of fire; ammunition train; field train; combat train; requisitions and shipping tickets.....	15
	100

■ 52. EXPERT GUNNERS.—*a. Candidates from headquarters batteries, except those in combat trains, will be required to pass in one of the following subjects:*

(1) *Duties of transportation sergeant.*—See paragraph 28 e.

(2) *Duties of communication sergeant.*—See paragraph 49 c.

(3) *Duties of observer.*—See paragraph 49 b.

(4) *Duties of chief of section.*—See paragraph b below.

b. Candidates from combat trains will be required to pass in the following subject:

Duties of chief of section.

(1) Detailed knowledge of the care, service, repair, and maintenance of motor vehicles in the field, to include trouble shooting and supervision of the making of emergency and minor repairs.....	30
(2) Detailed knowledge of procuring, handling, loading, unloading, and storage of ammunition under all conditions of service; arrangement of loads; capacities; precautions in handling; action in case of accident or emergency.....	25
(3) Loads and their proper distribution.....	5
(4) Training of drivers.....	10
(5) Organization of bivouac.....	10
(a) Camouflage and camouflage discipline.	
(b) Protection against low-flying aircraft and construction of shelters.	
(c) Protection against mechanized forces.	
(6) Detailed knowledge of the rules of the road, convoy regulations and discipline, speed laws and regulations, parking and road inspections.....	10
(7) Ammunition records, reports and forms; preparation, distribution, routing, and filing.....	10
	100

